NISTTech

Glycoprotein – Colloidal Particle Conjugates

Fast method for identifying the composition of glycoproteins

Description

The invention is a method for preparing and identifying the composition and structure of oligosaccharides attached to proteins, i.e., glycoproteins. The method can include the steps of immobilizing glycoproteins to colloid particles; using the glycoprotein/colloidal particles with sugar binding proteins such as lectins in an optical assay for identifying and screening oligosaccharides attached to the protein; or cleaving the oligo saccharides from the immobilized glycoproteins, thereby releasing oligo saccharides for further analysis by chromatography or mass spectrometry.

The inventors found that certain glycoproteins, specifically but not necessarily limited to polyclonal or monoclonal antibodies, spontaneously and strongly adsorb in a denatured state on gold nanoparticles. We speculate that the strong adsorption and denaturation result from the formation of gold-thiolate bonds from dissociation of many of the 16 disulfide groups present in classes of IgG antibodies. The relatively hydrophilic oligosaccharide structures (also known as carbohydrates, sugars, or glycans) of the adsorbed glycoprotein are then well presented to the aqueous solution for potential probing by biological binding or enzymatic reactions.

Abstract

Glycosylation of proteins is an important aspect of protein therapeutics and biomanufacturing. For example, many Food and Drug Administration (FDA) approved protein therapeutics, and those in clinical trials, are glycoproteins. A majority of FDA approved protein therapeutics may be glycosylated. Glycosylation is the enzymatic linking of sugar molecules to produce oligosaccharides or glycans covalently attached to the protein. This pattern of glycosylation may be crucial in biopharmaceutical development and manufacturing since it may influence binding, clearance, immunogenicity, and mechanism of action of the protein therapeutic. This invention is a method of characterizing glycans attached to glycoproteins. The method involves immobilizing the glycoproteins on colloidal particles forming glycoprotein/colloidal particles. The glycans on the glycoproteins may then be characterized, for example the composition and/or structure of glycans may be characterized or the glycans attached to the proteins may be identified.

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Citations

1. T.A. Morris, A.W. Peterson, M.J. Tarlov, Selective Binding of RNase B Glycoforms by Polydopamine-Immobilized Concanavalin A, Anal. Chem. American Chemical Society 81 (13) pp 5413-5420, 2009.

References

- U.S. Patent 8,962,345
- Docket: 09-016

Status of Availability

This invention is available for licensing exclusively or non-exclusively in any field of use.

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